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A NEW GENUS OF MIRINE PLANT BUGS, *GRACILIMIRIS*, WITH THREE NEW SPECIES FROM NORTH AMERICA (HETEROPTERA: MIRIDAE)

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Abstract.—The new mirine genus *Gracilimiris* and the new species *G. litoralis,* from the eastern United States, and *G. strigosus* and *G. wheeleri* from Arizona and Texas are diagnosed and described. All three species are associated with grasses (Poaceae). Male genitalia of all species are figured and a dorsal habitus is provided for the male of the type species, *G. litoralis.* Scanning electron micrographs are presented for the dorsal setae, scent gland ostiole, and pretarsus of *G. strigosus.*

Our studies of the genus *Phytocoris* Fallén in North America (Henry and Stonedahl, 1983; Stonedahl, 1988) revealed three undescribed species of the tribe Mirini that could not be placed in any known genus. Although similar to some species of *Phytocoris* in external appearance, the male genital structures of these taxa are sufficiently distinct to warrant their placement in a new genus. The unique combination of external diagnostic features supports this placement.

All measurements are given in millimeters. Abbreviations used in the locality data to denote specimen depositories correspond to the institutions listed in the acknowledgments.

Gracilimiris, new genus

Diagnosis. Recognized by the elongate body form (Fig. 1); head with anteriorly prominent frons and strongly produced base of tylus (Fig. 2); long first antennal segment with dense brush of stout setae ventrally (Fig. 3); flattened pronotal collar; carinate lateral margins of pronotum; and characters of the male genitalia, particularly the prominent, asymmetrical posteroventral region of the genital capsule (Fig. 8f) and structure of the parameres (see description of genitalia).

Description of macropterous male. Elongate, total length 4.64–7.03; general coloration brownish yellow or grayish yellow, with limited brown to fuscous markings; dorsal surface smooth or very faintly roughened, slightly shining, veins of hemelytra weakly elevated; dorsal vestiture with short to moderately long, golden brown to dark brown, suberect, bristlelike setae and recumbent, silvery white, sericeous setae (Fig. 7); thoracic pleura and abdominal venter with dense distribution of sericeous setae. **Head.** Subquadrate, slightly broader than long, weakly convex dorsally, well produced anteriad of antennal fossae in dorsal view; vertex slightly broader than width of one eye; frons noticeably produced anteriorly, projecting over base of tylus,

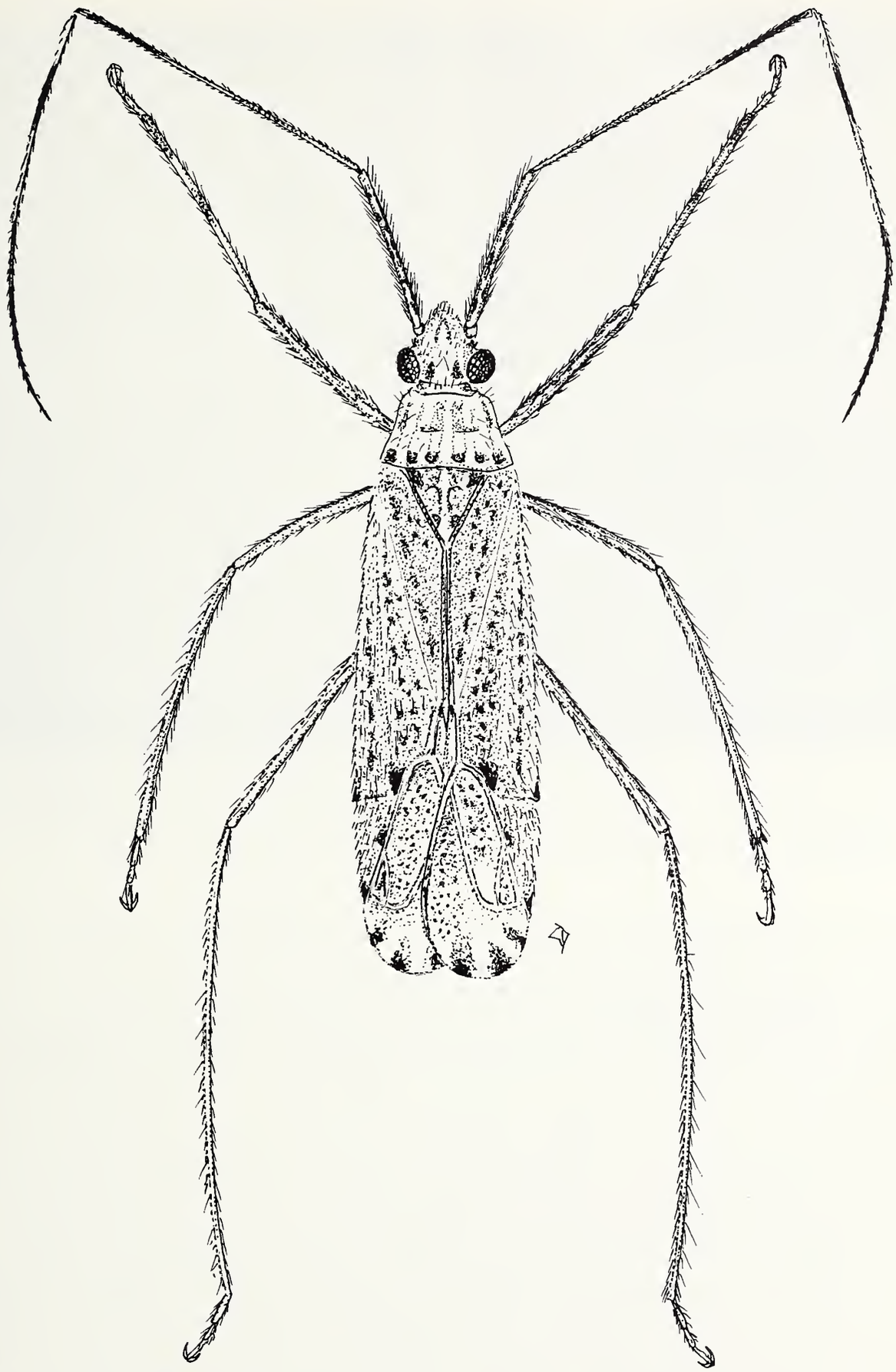
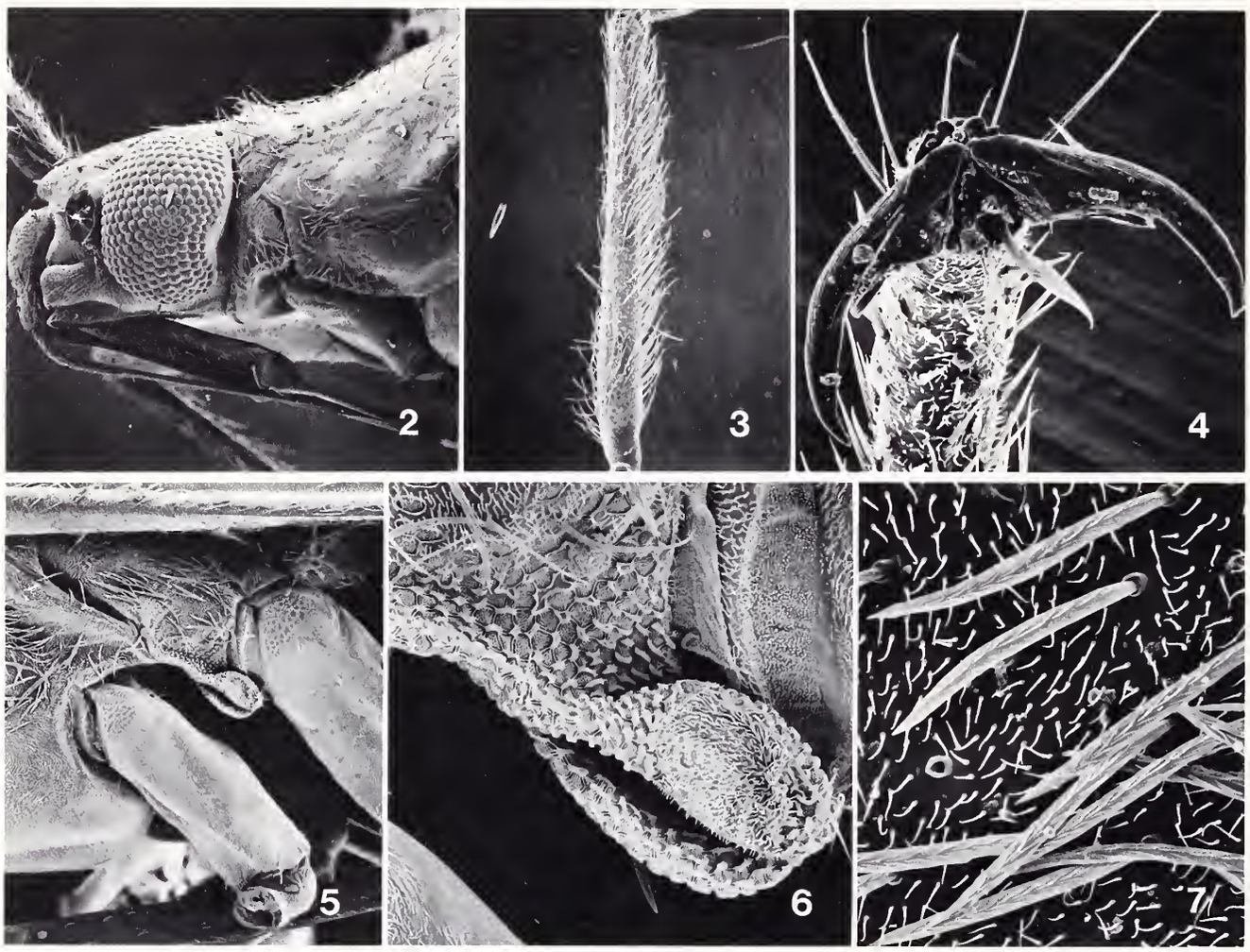


Fig. 1. *Gracilimiris litoralis,* dorsal habitus, ♂.



Figs. 2–7. Scanning electron micrographs of *Gracilimiris strigosus*. 2. Lateral view of head. 3. Antennal segment I. 4. Pretarsus. 5. Lateral view of thorax. 6. Ostiole and evaporative area of metathoracic scent efferent system. 7. Sericeous setae on hemelytra.

juncture with tylus strongly depressed (Fig. 2); tylus prominent, slightly bulbous basally, narrowing distally; lora quadrate, moderately inflated; gula well developed; eyes occupying most of height of head in lateral view, projecting laterally to slightly beyond anterolateral angles of pronotum in dorsal view; posterior margin of eye contiguous with anterior margin of pronotum; antenna inserted near median level of eye, fossa nearly contiguous with anterior margin of eye; antennal segment I linear or very slightly broadened basally, length equal to or greater than posterior width of pronotum, dorsal and lateral surfaces with long, pale setae (length of setae about equal to width of segment), ventral surface with dense brush of slightly longer setae; antennal segments II–IV linear, with fine, reclining setae, segment II usually with several longer, suberect setae; labium extending between metacoxae or slightly beyond. **Pronotum.** Trapezoidal in dorsal view; lateral margins weakly to strongly carinate posteriad of coxal cleft, carina becoming less prominent posteriorly (Fig. 2); posterior margin straight, or weakly and broadly convex with shallow concave region medially; posterior submargin with six weakly tumid scallops, each bearing a tuft of dark setae; anterior margin with flattened collar separated from remainder of pronotum by shallow suture which extends to lateral margins of pronotum; calli weakly elevated, narrowly separated medially, with shallowly depressed posterior borders; mesoscutum broadly exposed; scutellum weakly convex; ostiole and evaporative area

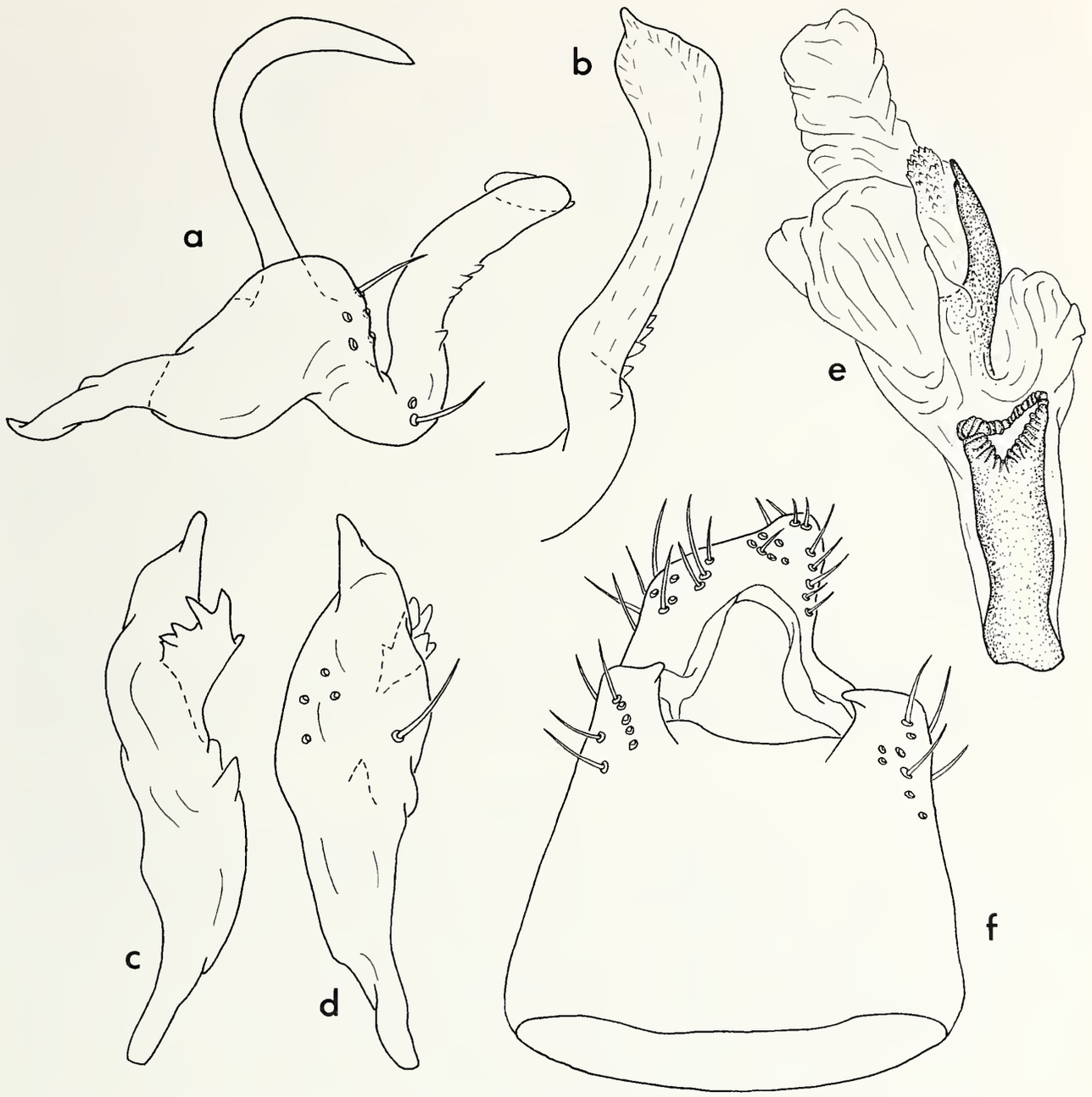


Fig. 8. a–f. Male genitalia of *Gracilimiris litoralis*. a. Left paramere, lateral view. b. Shaft of left paramere, dorsal view. c. Right paramere, dorsal view. d. Right paramere, lateral view. e. Vesica. f. Genital capsule, dorsal view.

of metathoracic scent gland as in Figures 5 and 6. **Hemelytra.** Elongate, subparallel, lateral margins straight or weakly rounded; length of cuneus 2.5–3.0 times basal width; apex of clavus and inner posterior angle of corium with tuft of dark, bristlelike setae; membrane lightly to densely conspurcate, spots usually coalescing to form larger dark marks distad of areolar cells. **Legs.** Femora elongate, hind pair strongly tapered, reaching beyond apex of abdomen; tibiae with four rows of dark (rarely paler) spines and dorsally with two irregular rows of tiny black spinules; tarsi elongate, segment I sometimes as long as segments II and III combined, segment II about half as long as segment III; pretarsus as in Figure 4. **Genitalia.** Genital capsule subquadrate, strongly produced and narrowed distad of paramere sockets (Fig. 8f), without tuberculate processes dorsad of sockets. Left paramere with prominent sensory lobe bearing large sickle-shaped process (Figs. 8a, 9a, 10a); shaft strongly elevated basally,

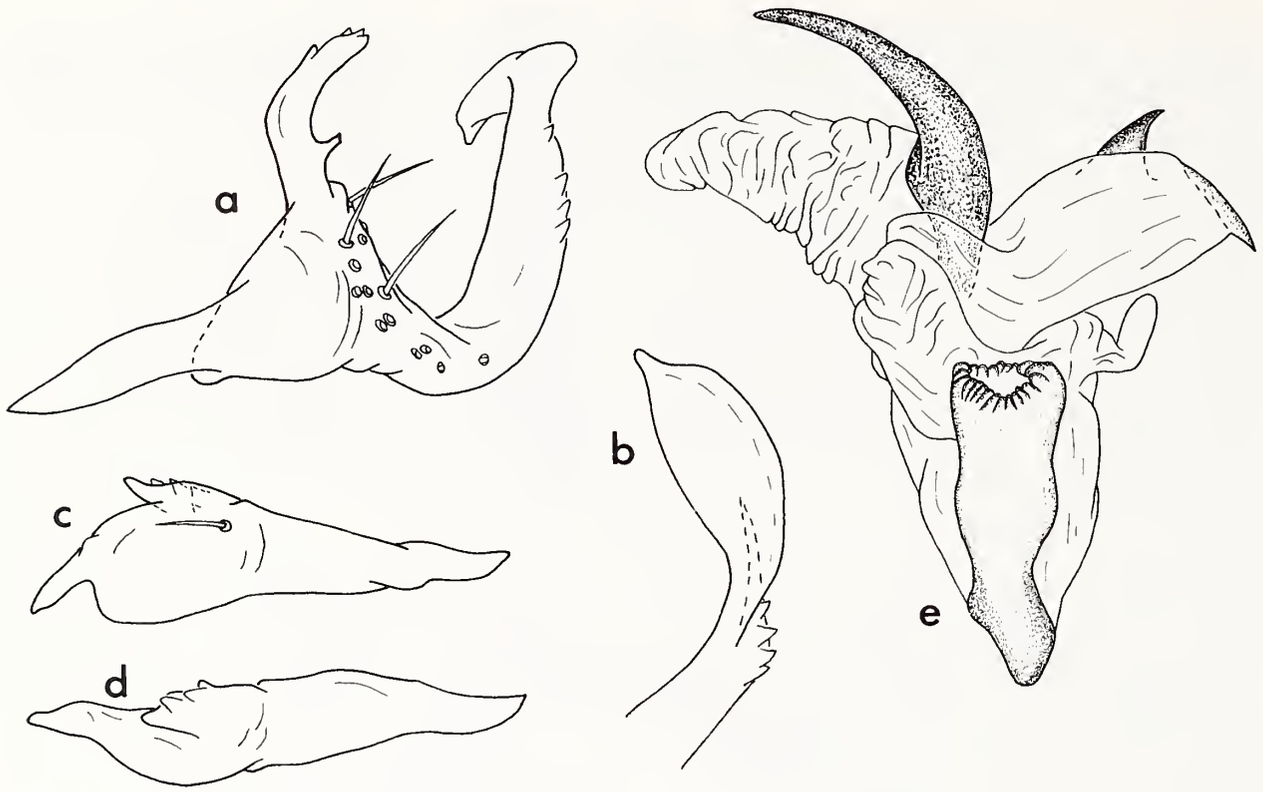


Fig. 9. a–e. Male genitalia of *Gracilimiris strigosus*. a. Left paramere, lateral view. b. Shaft of left paramere, dorsal view. c. Right paramere, lateral view. d. Right paramere, dorsal view. e. Vesica.

elongate, slightly expanded distally (Figs. 8b, 9b, 10b). Right paramere with prominent, toothlike process(es) on inner dorsal surface and at apex (Figs. 8c,d, 9c,d, 10c, d). Vesica with several membranous lobes and a single lobal sclerite process, lobes sometimes bearing a small sclerite or field of spines distally (Figs. 8e, 9e, 10e).

Female. Macropterous, submacropterous, or brachypterous. Head with smaller eyes and broader vertex than in male. Color and vestiture similar to male, except dorsum usually with fewer dark markings, and spots on hemelytral membrane sometimes restricted to region distad of areolar cells. Genitalia not examined.

Etymology. From the Latin, *gracilis* (slender, thin) and *miris,* referring to the slender body form; gender masculine.

Type species. Gracilimiris litoralis, new species.

Distribution. Arizona, west Texas, and the coastal eastern United States from Maryland to Florida and Texas.

Discussion. The relationships of the Mirini are not sufficiently known to allow us to determine with confidence the position of *Gracilimiris* relative to other genera of the tribe. Externally, the species of this genus resemble elongate species of *Phytocoris,* especially those placed in the *candidus* and *roseipennis* species-groups (see Stonedahl, 1988). In particular, the elongate body form with strongly tapered hind femora, subquadrate head with prominent frons, elongate first tarsal segment, and long first antennal segment with dense brush of long setae ventrally are characteristic of species placed in these groups of *Phytocoris.* None of the above external features are unique to *Gracilimiris* and *Phytocoris,* but occur in various combinations in other groups of Mirinae (e.g., *Alda* Reuter, *Eremobiellus* Reuter, *Euphytocoris* Poppius, *Miridius* Fieber, *Stenotus* Jakovlev, some Stenodemini). Clearly, a much broader survey of

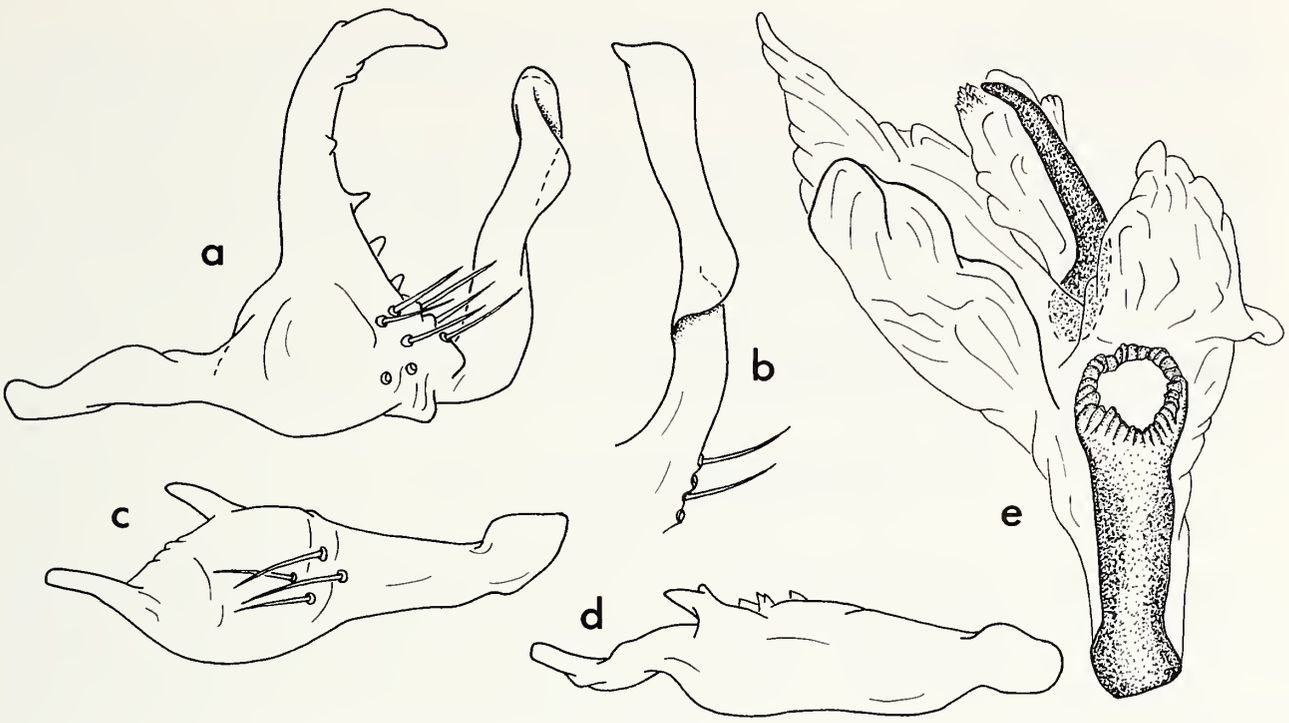


Fig. 10. a–e. Male genitalia of *Gracilimiris wheeleri*. a. Left paramere, lateral view. b. Shaft of left paramere, dorsal view. c. Right paramere, lateral view. d. Right paramere, dorsal view. e. Vesica.

taxa and characters is required to establish the relationships of *Gracilimiris* and other superficially similar mirine genera.

Other diagnostic features of the genus *Gracilimiris* include: (1) carinate lateral margins of pronotum, (2) flattened pronotal collar, (3) male genital capsule with strongly produced, asymmetrical, posteroventral region (Fig. 8f), (4) sensory lobe of left paramere with prominent, sickle-shaped process (Figs. 8a, 9a, 10a), and (5) right paramere with prominent toothlike processes on inner dorsal surface (Figs. 8c, d, 9c, d, 10c, d). Although the carinate pronotal margins and flattened collar are not unique features, we are unaware of any other Mirini that possess a genital capsule and parameres like those of *Gracilimiris* species. Some species of *Phytocoris* in the *aurora* group (Stonedahl, 1988) have a left paramere similar to that seen in *Gracilimiris,* but the shape and location of the process on the sensory lobe are different.

The host plant records for *Gracilimiris* species indicate that the genus is strictly associated with grasses (Poaceae). *G. litoralis,* has been collected on salt-meadow cordgrass, *Spartina patens* (Ait.) Muhl., a grass of coastal brackish marshes in the eastern United States, and *G. wheeleri* has been taken in Pima County, Arizona, on bush muhly, *Muhlenbergia porteri* Scribn. The only host record for *G. strigosus* comes from two specimens collected in Pima County, Arizona, on "grasses." All three species of the genus have been collected at light.

KEY TO SPECIES OF *GRACILIMIRIS*

1. Clavus and corium conspurcate (Fig. 1) with fuscous spots often surrounding bases of dark, bristlelike setae; antennal segment I marked with fuscous patches, sometimes coalescing to form dark stripes, or segment extensively darkened 2
– Clavus and corium without fuscous spots or dark bristlelike setae; antennal segment I

uniformly brownish yellow, sometimes suffused with darker brown but never with distinct fuscous patches or stripes; male genitalia as in Figure 10; Arizona and west Texas ..... *wheeleri,* new species

2. Apical fourth of antennal segment II noticeably darker than remainder of segment, sometimes also slightly darker medially; antennal segment III pale with broad, dark band below middle (Fig. 1); tarsi uniformly pale or with segment III narrowly infuscated apically; male genitalia as in Figure 8; coastal eastern United States from Maryland to Florida and Texas ..... *litoralis,* new species

– Antennal segment II uniformly brown or fuscous; antennal segment III dark brown, narrowly pale basally; tarsi uniformly fuscous; male genitalia as in Figure 9; Arizona and west Texas ..... *strigosus,* new species

Gracilimiris litoralis, new species
Figs. 1, 8

Diagnosis. Recognized by the conspurcate hemelytra, strong carina on lateral margins of pronotum, head with two dark spots bordering inner posterior angles of eyes, apical fourth of antennal segment II noticeably darker than remainder of segment, antennal segment III pale with broad dark annulus below middle, and male genitalia as in Figure 8.

Description of male. Length 5.14–7.03; general coloration pale grayish yellow, with limited brown to fuscous markings. **Head:** Width across eyes 0.66–0.88, vertex 0.26–0.37; pale brownish yellow with limited reddish-brown markings on frons and vertex, and two large fuscous spots bordering inner posterior angles of eyes. **Antennae:** I, length 1.13–1.82, pale with dark spots dorsally and laterally, spots often coalescing into three fairly distinct dark stripes; II, length 2.26–3.28, brownish yellow, sometimes slightly darker medially, apical fourth fuscous, much darker than remainder of segment; III, pale with broad, fuscous annulus below middle; IV, dark brown. **Labium:** Length 2.16–2.59; extending between hind coxae or slightly beyond. **Pronotum:** Posterior width 0.91–1.24; collar and calli with brown or brownish-red markings; disc bordering lateral margins lightly to moderately suffused with fuscous, especially opposite calli; lateral margins of disc distinctly carinate; posterior margin nearly straight, but with broad, shallow concave region medially; lateral angles of mesoscutum darkened; scutellum marked with brownish red or fuscous on either side of pale median stripe, and with two large fuscous patches laterally before apex. **Hemelytra:** Conspurcate, spots on membrane slightly smaller than those on clavus and corium; posterior angles of corium and apices of clavus and cuneus with larger fuscous marks. **Legs:** Grayish yellow or brownish yellow with red to fuscous markings, these mostly arranged in longitudinal lines; fore tibiae usually with two or three dark annuli; tarsi uniformly pale or narrowly darkened at apex of segment III. **Genitalia:** Figure 8.

Female. Brachypterous (forewings extending to abdominal segment VIII), length 4.56, or submacropterous (forewings just surpassing apex of abdomen), length 5.09–5.24; color and vestiture similar to male, except dorsum tending to have fewer dark markings; head slightly narrower than in male with smaller eyes and broader vertex, width across eyes 0.70–0.78, width of vertex 0.38–0.47; length of antennal segment I 1.53–1.67, segment II 2.66–2.73; length of labium 2.34–2.55; posterior width of pronotum 0.98–1.06.

Etymology. From the Latin, *litoralis* (of the shore), referring to the occurrence of this species in shoreline habitats, where it is associated with grasses.

Distribution. Coastal areas from Crisfield, Maryland to Devers, Texas.

Holotype ♂. USA. **Florida.** *Dade Co.:* Paradise Key, Feb. 19, Schwarz and Barber '19 (USNM).

Paratypes. USA. **Florida.** *Duval Co.:* 1♂, Jacksonville, June 30, 1959, D. Ribble (KU); 1♀, Jacksonville Beach, Sept. 26, 1970, on brackish grasses, F. W. Mead (USNM). *Gulf Co.:* 1♀, Port St. Joe, May 8, 1982, swept from *Spartina* sp., T. J. Henry (USNM). *Highlands Co.:* 2♂, Sebring, Oct. 10–30, C. T. Parsons (AMNH). *Hillsborough Co.:* 2♂, 1♀, Tampa, Sept. 10, 1927, E. D. Ball (USNM). *Orange Co.:* 1♂, Winter Park, May 10, 1940, H. T. Fernald (USNM). *Volusia Co.:* 1♂, Rt. 415, 2 mi N of Osteen, April 27, 1984, T. J. Henry, J. T. Polhemus and A. G. Wheeler, Jr., taken at light (JTP). *County ?:* 1♂, coast between Stuart and St. Augustine, June 17–25, 1951, O. Bryant (CAS); 1♂, Yankeetown, July 7, 1948, B. T. McDermont (KU). **Maryland.** *Somerset Co.:* 1♂, Crisfield, Aug. 5, 1932, in mosquito trap, F. C. Bishop (USNM). **Mississippi.** *Hancock Co.:* 2♂, Pearlington, June 25, 1948, R. H. Beamer (KU). **North Carolina.** *Onslow Co.:* 2♂, Ashe Island, June 4, 1975 and Aug. 19, 1975, ex *Spartina patens* (Ait.) Muhl., J. C. Dukes (USNM). **Texas.** *Liberty Co.:* 1♂, Devers, June 22, 1917, H. H. Knight (USNM).

Additional specimens. USA. **Florida.** *Hillsborough Co.:* 2 nymphs, Tampa, Sept. 10, 1927, E. D. Ball (USNM). **Maryland.** *Somerset Co.:* 1♂ (damaged with hemelytra missing), Crisfield, Aug. 3, 1932, in mosquito trap, F. C. Bishop (USNM).

Gracilimiris strigosus, new species
Figs. 2–7, 9

Diagnosis. Very similar to *G. litoralis* in general appearance, but distinguished by the uniformly darkened tarsi and second antennal segment, fuscous third antennal segment with base narrowly pale, weak carina on lateral margins of pronotum, and structure of the male genitalia (Fig. 9). This species also has smaller dark spots located more anteriad on the vertex than in *G. litoralis,* and the collar possesses a large dark spot on either side of the middle.

Description of male. Length 5.39–7.00; general coloration pale grayish yellow, with brown to fuscous markings. **Head:** Width across eyes 0.76–0.80, vertex 0.28–0.36; frons either side of middle with longitudinal series of brownish-red to fuscous marks; vertex with two fuscous spots between eyes. **Antennae:** I, length 1.24–1.50, mostly fuscous with pale spots dorsally and a single pale stripe ventrally; II, length 2.62–3.18, brown or dark brown, sometimes slightly paler basally, but never distinctly bicolored; III–IV, fuscous, segment III narrowly pale basaly. **Labium:** Length 2.26–2.48; extending between metacoxae. **Pronotum:** Posterior width 1.09–1.20; disc lightly suffused with fuscous, especially posteriorly and around calli; calli sometimes with darker brown or brownish-red markings; collar with large dark spot either side of middle; lateral margins of disc with weak carina; posterior margin weakly convex overall, but with broad, shallow, concave region medially; mesoscutum with dark marks either side of middle and sometimes at lateral corners; scutellum marked with brownish red or fuscous either side of pale median stripe, and with two large fuscous marks laterally before apex. **Hemelytra:** Conspurcate, spots on clavus sometimes restricted to veins; apices of clavus and cuneus, posterior angles of corium, and inner margin of cuneus with slightly larger fuscous marks. **Legs:** Pale, with limited brown-

ish-red to fuscous markings mostly arranged in longitudinal lines; fore femora sometimes more extensively darkened; fore tibiae sometimes with two or three dark annuli; tarsi uniformly darkened. **Genitalia:** Figure 9.

Female. Brachypterous (forewings extending to abdominal segment V or VI), length 4.94–5.24, or macropterous, length 6.54; color and vestiture similar to male, except dorsum with fewer dark spots; eyes much smaller than in the male and with correspondingly broader vertex, width across eyes 0.76–0.85, width of vertex 0.40–0.44; length of antennal segment I 1.50–1.75, segment II 2.81–3.10; length of labium 2.52–2.66; posterior width of pronotum 0.88–1.10.

Etymology. From the Latin, *strigosus* (lean, thin), referring to the slender body form.

Distribution. Southeast Arizona and west Texas.

Holotype ♂. USA. **Texas.** *Jeff Davis Co.:* Fort Davis State Pk., 5,200 ft, Aug. 24, 1970, at lights, J. R. and M. H. Sweet (TA&M; deposited in the USNM).

Paratypes. USA. **Arizona.** *Cochise Co.:* 1♂, Douglas, Oct. 15, 1963, J. H. Russell (USNM); 1♂, SW Res. Stn., 5 mi W of Portal, 5,400 ft, Oct. 5, 1956, E. Ordway (AMNH). *Pima Co.:* 1♂, Molino Basin, Santa Catalina Mts., June 9, 1958, C. D. MacNeil (CAS); 1♂, 1♀, Mt. Lemmon, Santa Catalina Mts., Aug. 3–4, 1967, L. A. Kelton (CNC), 1♀, Santa Rita Mts., June 12, 1933, R. H. Beamer (KU); 1♀, Santa Rita Mts., 4,500 ft, June 27, 1928, A. A. Nichol (USNM); 1♂, 1♀, 6 mi N of Sonoita, May 19, 1989, swept from grasses, W. A. Jones (USNM); 3♂, 1♀, Tucson, Aug. 4, 1967, L. A. Kelton (CNC). *Santa Cruz Co.:* 1♂, 1♀, Mustang Mt., June 12, 1933, R. H. Beamer (KU); 1♀, Mustang Mt., June 12, 1933, P. Oman (USNM); 1♂, Patagonia, Sonoita Crk., Oct. 14, 1927, J. A. Kusche (CAS). **Texas.** *Jeff Davis Co.:* 4♂, same data as for holotype; 1♂, Fort Davis State Pk., Aug. 23, 1969, Board and Hafernik (TA&M).

Additional specimens. USA. **Texas.** 1♂, 226, P. R. Uhler collection (USNM). This specimen bears two Uhler identification labels for *Pallococoris suavis* Reuter, an externally similar species placed in the genus *Phytocoris* (*candidus* group) by Stonedahl (1988). One of these labels has "Tex." written in the lower left corner, which is the only locality data provided with the specimen.

Gracilimiris wheeleri, new species
Fig. 10

Diagnosis. Distinguished from *G. litoralis* and *G. strigosus* by its smaller size; shorter, uniformly pale first antennal segment; clavus and corium sometimes lightly suffused with fuscous, but without distinct dark spots; and male genitalia as in figure 10.

Description of male. Length 4.64–5.62; general coloration pale yellow or grayish yellow; head and pronotum more brownish yellow; pronotal disc usually lightly suffused with red. **Head:** Width across eyes 0.62–0.64, vertex 0.30–0.34; frons with obscure red markings either side of pale median line; vertex tinged with fuscous, especially bordering eyes, but without distinct dark spots. **Antennae:** I, length 0.98–1.15, pale brownish yellow; II, length 1.97–2.26, brownish yellow, sometimes darker brown near apex; III–IV, fuscous, segment III narrowly pale basally. **Labium:** Length 1.46–1.65; reaching between metacoxae. **Pronotum:** Posterior width 0.91–1.03; pos-

terior lobe of disc lightly suffused with fuscous, dark spots on posterior submargin sometimes faint or indistinct; collar and calli often with faint red or brownish-red markings; lateral margins of disc weakly carinate, posterior margin broadly convex with a weakly concave region medially; mesoscutum mostly fuscous; scutellum mostly fuscous dorsally, sometimes with narrow pale stripe medially, lateral margins broadly pale. **Hemelytra:** Pale gray or grayish yellow, usually with light to moderate suffusion of fuscous, especially along veins, inner margin of corium and on cuneus; posterolateral region of corium and lateral margin of cuneus sometimes also lightly tinged with red; conspurcate pattern on membrane becoming noticeably denser distally. **Legs:** Pale brownish yellow with limited red or brownish-red markings, mostly restricted to ventral surface of femora and usually arranged in one or two longitudinal lines; tarsi usually slightly darker than tibiae. **Genitalia:** Figure 10.

Female. Submacropterous, with hemelytral membrane clearly shorter than in male, length 4.30–4.94; color and vestiture similar to male, except spots on hemelytral membrane usually restricted to region distad of areolar cells; eyes slightly smaller and vertex broader than in male; width of head across eyes 0.63–0.66, width of vertex 0.39–0.41; length of antennal segment I 1.20–1.35, segment II 2.23–2.41; length of labium 1.71–1.75; posterior width of pronotum 0.92–0.97.

Etymology. Named for our colleague and good friend Al Wheeler, Jr., who was the first collector to associate this species with its host plant, *Muhlenbergia porteri* Scribn.

Distribution. Southeast Arizona and west Texas.

Holotype ♂. USA. **Arizona.** *Graham Co.:* Pinaleno Mts., Stockton Pass, 5,200–5,500 ft, June 1–2, 1983, taken at mercury vapor light, R. T. Schuh and G. M. Stonedahl (AMNH).

Paratypes. USA. **Arizona.** *Cochise Co.:* 1♂, Chiricahua Mts., Cave Creek Ranch, Aug. 19, 1971, at light, K. Cooper (UCR); 1♂, Portal, 4,700 ft, Aug. 16, 1964, at light (UID); 1♂, Portal, 1,500 m, June 15, 1980, at UV light, R. T. Schuh and K. & R. Schmidt (AMNH). *Graham Co.:* 47♂, 3♀, same data as for holotype (AMNH). *Maricopa Co.:* 1♀, 7.5 mi SSE of Bumble Bee, 2,000 ft, Sept. 17, 1971, at light, M. A. Kolner and D. D. Covert (AMNH). *Pima Co.:* 1♂, Madera Cyn., Aug. 26, 1965, C. Slobodchikoff (UCB); 1♀, Sept. 4, 1955 and 4♂, 4♀, Sept. 23, 1955, Tucson, at light, F. G. Werner (UAZ); 8♂, 5♀, Sahuarita, Santa Rita Exp. Range, April 11, 1989, ex *Muhlenbergia porteri,* T. J. Henry and A. G. Wheeler, Jr. (PDA, USNM). **Texas.** *Presidio Co.:* 1♀, Presidio, July 30, 1968, at UV light, J. E. Hafernik (TA&M). *Randall Co.:* 1♀, Palo Duro Cyn. State Pk., Aug. 10, 1965, at light, J. C. Schaffner (TA&M).

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